

Hardy Fern Foundation Quarterly



THE HARDY FERN FOUNDATION

P.O. Box 166

Medina, WA 98039-0166

Web site: www.hardyferns.org

The Hardy Fern Foundation was founded in 1989 to establish a comprehensive collection of the world's hardy ferns for display, testing, evaluation, public education and introduction to the gardening and horticultural community. Many rare and unusual species, hybrids and varieties are being propagated from spores and tested in selected environments for their different degrees of hardiness and ornamental garden value.

The primary fern display and test garden is located at, and in conjunction with, The Rhododendron Species Botanical Garden at the Weyerhaeuser Corporate Headquarters, in Federal Way, Washington.

Satellite fern gardens are at the Stephen Austin Arboretum, Nacogdoches, Texas, Birmingham Botanical Gardens, Birmingham, Alabama, California State University at Sacramento, Sacramento, California, Coastal Maine Botanical Garden, Boothbay, Maine, Dallas Arboretum, Dallas, Texas, Denver Botanic Gardens, Denver, Colorado, Georgeson Botanical Garden, University of Alaska, Fairbanks, Alaska, Harry P. Leu Garden, Orlando, Florida, Inniswood Metro Gardens, Columbus, Ohio, Lewis Ginter Botanical Garden, Richmond, Virginia, New York Botanical Garden, Bronx, New York, and Strybing Arboretum, San Francisco, California.

The fern display gardens are at Bainbridge Island Library, Bainbridge Island, WA, Lakewold, Tacoma, Washington, Les Jardins de Metis, Quebec, Canada, University of Northern Colorado, Greeley, Colorado, and Whitehall Historic Home and Garden, Louisville, KY.

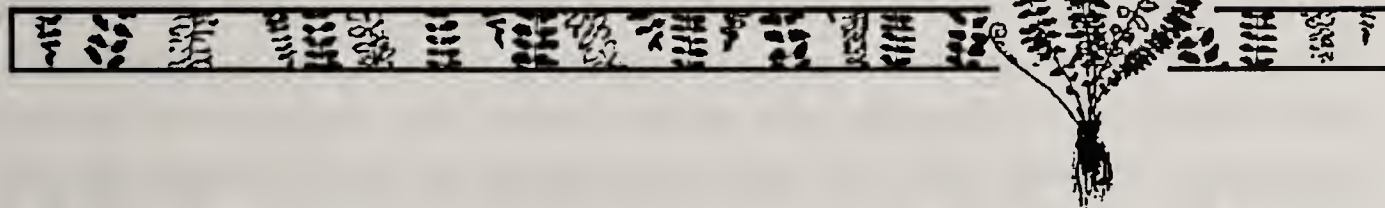
Hardy Fern Foundation members participate in a spore exchange, receive a quarterly newsletter and have first access to ferns as they are ready for distribution.

Cover Design by Willanna Bradner

HARDY FERN FOUNDATION QUARTERLY

QUARTERLY

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The Spore Exchange Needs You!

Please send your spores to our new Spore Exchange Director:

Katie Burki
501 S. 54th St.
Tacoma, WA 98408

President's Message

Spring 2003

It is hard to believe that we have just finished the winter of 2003. In spite of a rather wet and cool spring, we are told that we will probably have water conservation restrictions this summer and the skiers and snow boarders are upset with the current warm temperatures and lack of snow. Most of us are happy that spring is marching on however, as there are so many things to accomplish prior to our annual Fern Festival sale and the welcoming of our BPS and eastern United States HFF friends. Time is rapidly shrinking.

By the time most of you receive this Quarterly, I will be turning over my Presidential duties to our President Elect, John van den Meerendonk who, I'm sure, will hit the ground running and guide us through some very interesting and challenging projects already in progress.

As I reflect back on my very short two years I am humbled by the cooperative spirit and courtesy bestowed by so many of our members. This has truly been a gratifying experience. Thank you one and all.

As previously mentioned, our annual Fern Festival sale and lecture will be held on Friday, May 30th. The sale will be from 1:00-6:00 PM with coffee at 7:00 and a lecture at 7:30 by Bors Vesterby discussing Key Washington Ferns. Plant sales will continue on Saturday, May 31st from 10:00 to 2:00 with a propagation workshop at 11:00 AM. We will again have a silent auction of some very special plants.

March was a busy month for many of us beginning with a board meeting at Lakewold Gardens followed by a tour of a new location for an expanded fern garden. The topography appears well suited and includes a newly installed sprinkler system covering a gently sloping area with a view of the lake.

The following weekend a group participated in a work and potluck party at RSF to help with the renovation of the Lower Woodland Garden. When completed, this display garden will be one of the best in Western U.S.

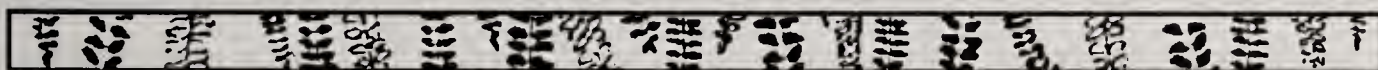
Our annual grooming of the ferns at the Bellevue Botanical Garden occupied part of our third weekend. Although short in duration it can prove challenging to one's back and knees; but it was enjoyable and invigorating. I'm very pleased we are able to do this. Thanks to all.

I find this to be a particularly exciting time for the HFF, not only that it is spring but because of all the potential of our anticipated projects ahead - Lakewold Gardens, RSF garden renovation, Bainbridge Island Library Garden, Parks in Tacoma, WA and the much coveted Signature Garden at the Washington Park

Arboretum. The opportunities for artistic creation and advancement of knowledge abound. I feel exceptionally privileged to have been a part of these undertakings with this organization.

Thank you to all for making my job easy and so pleasant.

Best regards,
Pat Kennar
President



Summer Fern Forays in the Smokey Mountains

*Mike Barker
Miami University
Oxford, Ohio*

As part of the All Taxa Biodiversity Inventory in the Great Smokey Mountains National Park, fern forays are held each summer to assist with inventorying all fern taxa in the park.

This summer we will have three such fern forays: May 31, June 21, and July 12. These forays involve running transects on trails in the park, and collecting abundance data on ferns every 200 meters.

If you are interested in attending this year's forays, please contact either myself at barkerms@muohio.edu or Pat Cox (pcox@utk.edu). If you are unfamiliar with ferns in the eastern US, this is a great way to learn. Many of the volunteers who help us do not know the different fern taxa at the beginning of the day, but are fairly adept by the end. Its a lot of fun and you can have the satisfaction of assisting in the first project to inventory all living organisms within a relatively large area, the Great Smokey Mountains.

The Hardy Fern Foundation Board wishes to thank
retiring Shannon Toal for her work as Director of the Spore Exchange
and Sue Mandeville for her years of service as our Webmistress.
We're most grateful for all of the help they have given the organization.

We welcome Katie Burki as our new Spore Exchange
Director and Bors Vesterby as our new Webmaster.

Ferns and Fern Allies of the Trans-Pecos and Adjacent Areas.

By Sharon C. Yarborough and A. Michael Powell. Lubbock: Texas Tech University Press, 2002. xx + 116 pp. Illustrations, glossary, references, and index. \$17.95 paper. (ISBN 0-89672-476-X)

This handy field guide treats 76 species and two sterile hybrids known from the Trans-Pecos region, which comprises the westernmost 15 counties in Texas, southwest of the Pecos river. This is a surprising number for such a small area, considering the climatic harshness of the region. This total represents approximately 70% of the species of ferns and allies known for the entire state and 96% of the number of species known from the area treated in *Flora of the Great Plains* (1986).

The authors, both respected botanists, include general and illustrated discussions of fern morphology, reproduction, and hybridization, followed by a key to families. There is also a quick one-page identification guide, using prominent features of the plant (e.g., habit, size, leaf dissection, sorus shape), to the more distinctive and common genera and species of the area. Each species is illustrated with adequate line drawings (three different artists contributed) and mapped, using a combination of shading (species of common occurrence), dots (outlying or isolated localities) and stars (unconfirmed reports). An illustrated glossary, references, and index conclude the book. The authors follow the *Flora of North America North of Mexico*, Vol. 1 (1993) in circumscription of families, genera, and species.

It is no surprise that the most common family in the area is Pteridaceae, the maidenhair and brake ferns, many species of which are especially adapted to arid environments. Altogether, 38 species in seven genera, half the total for the area, are members of this single family.

Ferns of the Trans-Pecos are still relatively poorly known, with 31 species rare (often two or fewer stations known within the region), or in some cases perhaps no longer extant. Many of these are cheilanthoid ferns (*Cheilanthes*, *Notholaena*, *Pellaea*), but three of the four known spleenworts (*Asplenium*), and all three fragile ferns (*Cystopteris*) are rare in the Trans-Pecos. This statistic suggests that further exploration will lead to the discovery of additional rarities from the region. One hopes that this book will stimulate and motivate those interested in plants to make new finds in this seriously underexplored and botanically varied area.

I recommend this book, which is as free of errors as a book can be, to professionals and amateurs alike, especially those who plan to explore this part of Texas, or to pteridophiles with a penchant for learning more about ferns. The book would also be suitable for identification of ferns from adjacent areas of New Mexico and Texas.

Alan R. Smith, *University Herbarium, University of California, Berkeley.*

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FERN FESTIVAL 2003

Center for Urban Horticulture
3501 NE 41st St.
Seattle, WA

Friday May 30th - Plant Sale 1:00 - 6:00

Annual Meeting 6:30 Coffee 7:00

7:30 Lecture

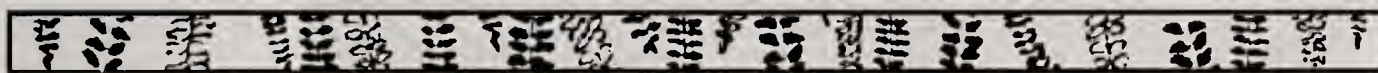
KEY WASHINGTON FERNS

by Bors Vesterby

Sat. May 31st - Plant Sale 10:00 - 2:00

Propagation Workshop 11:00

*Sale will feature hardy and exotic ferns
and shade loving companion plants.*



Welcome New Members

Timothy Betts

Linda Easton

Scotty Fairchild
Leach Botanical Garden

Danilo D. Fernando
*Dept. of Environmental & Forest
Biology, State Univ. of NY - ESF*

Bill Kloster

Timothy McNitt

Geri Mensonides

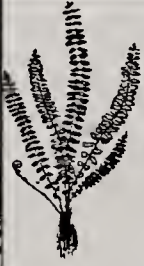
Alan Ogden

Martin Souza

Naomi States

Dorothy Turner

Barbara D. Wetzel



THE HARDY FERN FOUNDATION
QUARTERLY

The Hardy Fern Foundation Quarterly is published quarterly by the Hardy Fern Foundation, P.O. Box 166 Medina, WA 98039-0166.

Articles, photos, fern and gardening questions, letters to the editor, and other contributions are welcomed!

Please send your submissions to:
Sue Olsen
2003 128th Ave SE,
Bellevue, WA, 98005

Newsletter:

Editor:	Sue Olsen
Assistants:	Michelle Bundy
Graphics:	Willanna Bradner (cover design) Karie Hess (inside design)

Perplexing Pellaeas

Joan Eiger Gottlieb - Pittsburgh, PA

The cheilanthoid ferns (*Argyrochosma*, *Aspidotis*, *Astrolepis*, *Cheilanthes*, *Notholaena*, and *Pellaea*) -- one of three evolutionary lines in the family Pteridaceae - have always been taxonomically challenging, not only to hobbyists, but to expert pteridologists as well. These xeric-adapted genera are characterized by marginal or near-marginal sporangia protected by false indusia from recurved pinna edges. They have evolved many characters that toughen them for life in inhospitable deserts or on exposed rocks, e.g., abundant hairs, scales, waxy farinas, and leathery, reduced (even bead-like) pinna segments. During prolonged desiccation, whole fronds may dry to a crisp and curl inward, only to "resurrect" and flourish again when rehydrated. In addition to these structural adaptations (dare I say obfuscations), these dry land ferns engage in a variety of bizarre reproductive strategies, such as apogamy*, apospory*, and polyploidy* which have enabled them to bypass sexual reproduction and succeed in habitats that are hostile to ferns with water-requiring gametophytes and broad, feathery fronds.



Pellaea glabella

For the technically-challenged fern lover, telling species and even genera of cheilanthoids apart can be maddening. In the northeastern part of the U. S. the task is made easier by the relative paucity of species. Our natives are *Cheilanthes tomentosa* (reported, but rare on rocks in Pennsylvania and West Virginia), *Cheilanthes lanosa* (occasional on rocky slopes), and the two species of cliff-brake - the purple *Pellaea atropurpurea* and the smooth *P. glabella* that are the subject of this report. The genus *Pellaea* contains about 40 species distributed in rocky habitats worldwide. Most are in the western hemisphere, with 15 listed in the *Flora of North America North of Mexico*— (1993), predominantly in arid parts of Arizona, California, Colorado, Idaho, New Mexico, Nevada, and Texas. Here in the east, rock outcrops and large boulders within temperate ecosystems provide the well-drained habitats these ferns require. In the case of our cliff-brakes, both of which are evergreen calciphiles, the rock of choice is limestone.



Pellaea atropurpurea

I have encountered *P. atropurpurea* many times on limestone outcrops in Pennsylvania (McConnells Mill State Park, Lawrence County; Lancaster City Park, Lancaster Co.) and even on the calcareous mortar of bridge abutments (C and O Canal, Cumberland Co.) It has a fresh green color when growing in partial shade and a lovely bluish-green in sunnier niches. Plants of purple cliff-brake require protection from full, direct sun exposure. Juvenile fronds tend to be small and once-pinnate, but mature fronds can be 40cm (15") long and twice pinnate, especially near the base. The rachis and stipe are a lustrous reddish purple, cloaked in abundant curly hairs that are easy to see with a hand lens. Its foliar color contrasts and leathery pinnae make *P. atropurpurea* a most attractive fern -- always a thrill to find.

Distinctive as purple cliff-brake is, it is easily confused with its sister species, the smooth cliff-brake. The two ferns can be found in the same area, *e.g.* Lynx Prairie Reserve in southwestern Ohio (Adams Co.), where they grow on large dolomite (limestone rich in magnesium carbonate) boulders and outcrops, scattered over a remnant prairie administered by the Cincinnati Museum of Natural History. The best way to tell

continued on page 44

Polystichum retrosopaleaceum

James R. Horrocks

Salt Lake City, Utah

The translation of *Polystichum* is “many stitches” and *retroso* or *retrorso* refers to the scales on the rachis being directed backward and pressed close to the surface of the rachis (appressed) rather than spreading outward. In most books on ferns, the spelling is “retroso” but in Jisaburo Ohwi’s *Flora of Japan*, the spelling is “retrorso” which may be technically correct since Webster’s *Dictionary of Scientific Terms* lists the botanical term “retrorse”, meaning “pointing backward”. Be that as it may, the last portion of the specific name “paleaceum” means simply “chaffy”. This is a beautiful fern with a large spreading rosette of bright green fronds that are somewhat shiny but not nearly as glossy as *P. polyblepharum* which it is often confused with. It is actually a more clear green than dark green. Also, *P. polyblepharum* does not have the lower broadly ovate stipe scales with long points or filiform apical tails, but rather lanceolate triangular scales. To the author, *P. retrosopaleaceum* somewhat resembles *P. braunii* but on a larger scale. There is one variety recorded : ‘Cruciatum’.

P. retrosopaleaceum is native to Japan and Korea, frequenting the woods in mountainous areas. It is terrestrial, preferring to grow in open woods and on hillsides, the soil circumneutral to somewhat acidic.

Description: The rhizome is large and stout but short. The fronds emerge in a basket-like fashion, growing in small clumps. The emerging fiddleheads are quite large, being as large as a 50 cent piece before they begin to unroll. The stipes are densely scaly and are 8 to as much as 16 inches long. The scales are membranous, pale brown with a sheen, and exhibit a fringe of fine hairs (ciliate). The largest scales are spreading and ovate with an abrupt short tail at the tip, and most numerous at the base. The middle scales are abundant and are appressed to spreading, orbicular-ovate to simply ovate, and again displaying short apical tails. The smallest scales are appressed and may or may not have the filiform apical tails, which, if present, are much longer than the lower broadened portion of the scales. The arching, bipinnate fronds are from 1 1/2 to 3 1/2 feet in length and from 5 inches to nearly 12 inches wide. They are abruptly acuminate and somewhat narrowed at the base. The scales on the rachis are orbicular-ovate to ovate and are retrorsely appressed, that is, pressed backwards against the surface of the rachis (hence the species name). These scales are thin, dry and membranous with long hair like smaller scales, spreading to deflexed, especially on the upper side. The pinnules are herbaceous with sides unequal, ovate to ovate-oblong and rather rounded at the apex with a short spiny tip. There is a blunt somewhat acute auricle on the anterior side. The pinnule teeth are ascending to appressed and spine-tipped. The hair-like scales on the pinnules are quite sparse and tardily deciduous on the upper side. On the underside, they are more prominent. The sori are in two series on the upper half of the frond. The indusia are impressed.

Culture: This species is a rather handsome addition to any garden where it may be grown in the open ground, although it seems happy nestled near a large rock. It is rarely grown in the United States but as it is becoming more available from some nurseries that specialize in rarer ferns, it may become more frequent in collector's gardens. It is hardy to zone 5 and has thrived in the author's garden for many years. It dislikes being transplanted when older and its only big drawback is that it breaks dormancy rather early in the spring (late March here in northern Utah). This can cause problems if there are spring frosts, so it will need protection. It is a splendid and attractive plant and not at all difficult to grow.

References:

Flora of Japan (1965) Jisaburo Ohwi, Smithsonian Institution, Washington, D.C.

Fern Grower's Manual (revised 2001), Barbara Joe Hoshizaki & Robbin C. Moran, Timber Press, Portland, OR.

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Polystichum retrosopaleaceum. Photo by Richard Young - Salt Lake City, UT.

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Polystichum retrosopaleaceum. Photo by Richard Young - Salt Lake City, UT.

Borrowing the Thoughts of Others

Catharine W. Guiles

New Gloucester, ME

Every few winters Mother Nature bears down on those of us who live in the Northeast just to remind us not to get soft and lazy. The winter of 2003 has delivered such a message: deep snow, bitter cold, ice, wind-chill statistics you don't want to know about, soil frozen to a depth below that at which water lines are normally buried, heating systems that prove inadequate, and wood stoves that once again prove their worth. In three months or so, we will see just what the term "hardy fern" really means.

Today is the Ides of March, and outside we are surrounded by two feet or so of snow, and most everything related to gardening is buried. Inside, however, a little idea has been staying alive, like an ember in the stove.

Last fall, A. R. "Matt" Busby, in England, communicated through Fernet his wish for literary texts in which ferns are mentioned. He wished to have them for an exhibit he was preparing. Well, the good people in cyberspace sent in their offerings, and I think it is worth while giving this disparate collection of verses a life beyond Mr. Busby's exhibit. Therefore, as my fern garden offers nothing at the moment in the way of subject matter for an article, and as it is not practical, given the season and many worries about the world, to go on a junket visiting other gardens and conservatories, this is the time to follow in the footsteps of those term-paper hacks who stitch together quotes from other, more imaginative writers.

One of the first items submitted to Mr. Busby were the lines from Walter de la Mare's "The Listeners":

'Is there anybody there?' said the Traveller,
Knocking on the moonlit door;
And his horse in the silence champ'd the grasses
Of the forest's ferny floor:
And a bird flew up out of the turret,
Above the Traveller's head;
And he smote upon the door again a second time;
'Is there anybody there?' he said.

Then, someone offered the following lines from Robert Frost's "A Line-Storm Song" from his 1915 collection, *A Boy's Will*.

Oh, never this whelming east wind swells
But it seems like the sea's return
To the ancient lands where it left the shells
Before the age of the fern;
And it seems like the time when after doubt
Our love came back amain.
Oh, come forth into the storm and rout
And be my love in the rain.

Being self-serving, I could not resist sending in these lines by my aunt, Charlotte Wilder, a co-recipient in 1937 of the Shelley Memorial Award for Poetry. It is from her book *Mortal Sequence* (1939).

Ferns

"They straighten—dogged—to their height,
 Undoubling from a wound
No one gave them. Long they grind
 Foreheads on the ground,
Dark endeared to them by dread,
 Doubting they can bear
Sun between their lids, and hands
 A-flurry in the air."

One answered, whispering from the elms:
 "They straighten to their height,
Unreluctant, born to be
 Green resorts of light."

One sighed among the grasses: "So
 We bid them go."

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Borrowing the Thoughts of Others continued from page 49

And here are the last three verses of an untitled poem attributed to Emily Brontë:

I'll walk, but not in old heroic traces,
And not in paths of high morality;
And not among the half-distinguished faces,
The clouded forms of long-past history.

I'll walk where my own nature would be leading:
It vexes me to choose another guide:
Where the grey flocks in ferny glens are feeding;
Where the wild wind blows on the mountain side

What have those lonely mountains worth revealing?
More glory and more grief than I can tell:
The earth that wakes one human heart to feeling
Can centre both the worlds of Heaven and Hell.

For a change of tone, here is a delightful offering about the Royal fern from a Fernet subscriber who reported in from the Isle of Skye. The author is anonymous:

Auld Botany Ben was wont to jog
Thro' rotten slough and quagmire bog,
Or brimfully dykes and marshes dank
Where Jack-a-Lanterns play and prank,
To seek a cryptogameous store
Of Moss, of Carex, and Fungus hoare,
Of Ferns and Brakes, and such-like sights,
As tempt out scientific wights
On winter's day; but most his joy
Was finding what's called Osman Roy.

At this point, probably the reader's patience is stretched, and therefore I'll only mention that there were other submissions by, among them, A. S. Byatt, William Butler Yeats, Alphonse de Lamartine (in French), Jack London, Wallace Stevens, Marianne Moore, and a few, more recent writers whose names were not familiar to me. Alas, after the literary conversation on Fernet had ended, and Mr. Busby had sent in his thanks for everyone's help, I happened, while re-reading Thomas Hardy's *Return of the Native*, to find the following paragraph, with which I close this effort. The "he" refers to Hardy's protagonist, Clym Yeobright, and the location is, of course, Egdon heath in Hardy's Wessex.

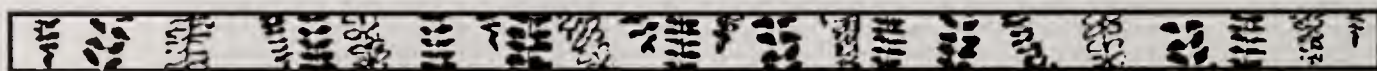


Illustration from Willard Nelson Clute, *Our Ferns in Their Haunts: A Guide to All the Native Species*. Illus. William Walworth Stilson. New York: Frederick A. Stokes Company, 1901, p. 37.

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Borrowing the Thoughts of Others continued from page 51

He was in a nest of vivid green. The ferny vegetation round him, though so abundant, was quite uniform: it was a grove of machine-made foliage, a world of green triangles with saw-edges, and not a single flower. The air was warm with a vaporous warmth, and the stillness was unbroken. Lizards, grass-hoppers, and ants were the only living things to be beheld. The scene seemed to belong to the ancient world of the carboniferous period, when the forms of plants were few, and of the fern kind; when there was neither bud nor blossom, nothing but a monotonous extent of leafage, amid which no bird sang.



The Garden in Winter

Bill Plummer - Painted Post, NY

This Sunday morning after I came home from church, I made myself a cup of tea and laid a fire in the fireplace. The radio was on bringing me St. Paul Sunday as I sat in my blue chair and started working on the New York Times Sunday crossword puzzle. Our Christmas tree was still up, not to be taken down until Twelfth Night, and the Poinsettias on the hearth made a lovely indoor setting. As I worked the puzzle I would occasionally look at the roaring fire and through the sliding doors to the patio and the back woods. What a beautiful sight what with the recent snow outlining every limb on every tree and bush in the woods. On the patio the wrought iron chairs and table had a lovely blanket of snow. A dwarf boxwood had a dome snow hat which was quite enchanting. A small beech tree in the woods still retained its leaves and the brown seedpods still hung on the silverbell tree. Off to the right of the silverbell was the Kousa dogwood with its attractive flaking bark.

Putting down the puzzle I meandered out to the family room and gazed out the window to the front yard and woods. With icicles starting to form on the gutters, the scene of snow-laden branches was repeated in the front woods. Every truss on my six-foot tall Janet Blair Rhododendron had its own hat of snow as did the Japanese Hollies. Looking across the ribbon of lawn only a few of the stones in my wall were visible, but as the days go by and the sun returns they will reappear. First to emerge from their blanket of snow will be where the snow is not quite so deep or where the sun is stronger. I note with pleasure the varying colors and textures of the bark on the trees – from the alligator-like bark of the dogwoods to the dark furrowed bark of the pines, the smooth bark of the maples, the dark and light rough bark of the black and white oaks, the shaggy bark of the hickories. Surpassing them all is the reddish flaking bark of the paper bark maple. My snow covered sitting rock backed by rhododendrons makes a lovely accent along the

path. Beyond that in the row of shrubs in the front hedge, the bright red berries of the spice bush cling tightly to each branch. Looking toward the driveway the Serbian spruce is a thing of beauty standing tall and narrow with its pendulous branches. Although I cannot see them from the window, I know that the row of Hemlocks make a picture of green and white on the south border. Although still in winter's grip, I know that beneath the blanket of snow plants are stirring. Already we have 10-12 minutes more of daylight at the end of the day. In milder snow-free winters, the snow drops would have emerged and maybe even be in bloom. If I looked hard enough in such a winter I could find a few grass-like leaves of spring beauty.



5 January 2003



Forms of the American Christmas Fern (*Polystichum acrostichoides*).

Part II Shapes / forms involving the entire frond

John D. Scott
Rockland Botanical Garden

In this section I will describe some interesting entire frond shapes and some forms involving multiple pinnae so-called crested forms.

Part IIa – Un-forked fronds



Figure 1
Typical Frond

**Rockland Botanical
Garden photo**

Wherry (1961) gives the following dimensions: "Stipe *ca.* 1/3 to 1/2 as long as blade... Blade... 25 to 50-cm long and 6 to 12 cm broad." The shape is generally nearly triangular, narrowing slightly with the lower several pinnae pairs. On the same frond, the pinnae are pointed to slightly rounded.

Figure 2

Narrow Form

Rocky Hill,
near Princeton, NJ

ANSP:

John C. Peters

Mercer Co., NJ

November 10, 1884

The narrow frond occurs occasionally with a variety of pinnae types, including normal pinnae shown here. The frond in figure is 31.4 cm (12.4 in) \times 2.7 cm (1.1 in)



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Figure 3

Ovate form

**Rocky Hill,
near Princeton, NJ**

ANSP:

John C. Peters

Rocky Hill,

Mercer Co., NJ

September 20, 1884

Dimensions: 17.6 cm (6.9 in) × 7.6 cm (3.0 in)



Figure 4

Spiralled form

USMN:

R. A. Doray

Amhurst, Mass.

August 24, 1944

This spiralled form has been observed only once on the specimen shown here. The herbarium sheet has 2 fronds. The specimen is 16.2 cm (6.4 in) long by 8.4 cm (3.3 in) wide.

Part IIb – Divided fronds



Figure 5

Forked frond

ANSP: 640875

Thomas Porter

Franklin, PA

1894

The typical forked frond branches two or three times, all in the same plane. Dimensions: Frond, 27.1 cm (10.7 in). Lower fork to tip 7.2 cm (2.8 in).



Figure 6

Forma *cristatum* (Clute)

Rockland Botanical Garden Photo

Clute (Crested Christmas Fern.—Fern Bull. 20: 80-81. 1912) based his name on a plant collected by Mr. Amedee Hans near Locust Valley, Long Island, N. Y. Clute writes “With the exception of the tips, the fronds are quite like those of normal specimens. At the tip, however, the midrib divides again and again forming a compact little tuft.” A type specimen could not be located.

FERNALD, M. L. (1950) *Gray’s Manual of Botany*, eighth edition describes “forma *cristatum* Clute (crested), with tip of frond more or less forking”. This is not really correct. In the form *cristatum* the tips of the frond or its branches are multi-layered as in the figure. This is my interpretation of the term “tuft.”

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Figure 7

Crested / forked frond



ANSP:

Edgar T. Wherry

Chester Co., PA

July 26, 1948

Figure 8

Lacerated / forked

ANSP: 553454

Harold Goddard Fugg

Reading, VT

July 1906



Part IIc

In conclusion of this section I present 3 composite fronds. They have several things in common. All three fronds are small, but have normal sized pinnae. The smallness is due to a reduced number of pinnae. All three have a terminal pinna that differs from the other pinnae.



Figure 9

Composite Frond

NYBG:

Hunter College

Fort Lee, NJ

December 1, 1884

Figure 9 is from Fort Lee, NJ. The herbarium sheet is dated 1884, Department of Botany, Hunter College but lists no collector. The frond is 18 cm (7.24 in) long. The lower pinnae are of the form *incisum*. The terminal pinna is larger and tending toward *multifidum*.

Figure 10

Composite Frond

Umbrella Hill

ANSP:

C. L. Gruber

Kutztown, PA

December 23, 1937



Figure 10 was collected by C. L. Gruber near Kutztown, PA. It is approximately 18 cm long. The lower pinnae are form *incisum* and the terminal pinna is form *multifidum*. Gruber noted "the other fronds on the plant were of normal form."

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Figure 11

Composite Frond

Rockland Botanical Garden
Specimen

Figure 11 is from a living specimen collected in the woods near the Rockland Botanical Garden – about 9 miles from Gruber’s location. The blade measures 8.7 cm (3.4 in) long. The lower pinnae are mostly the fish-tailed form. The terminal pinna is between forma *crispum* and *multifidum*. The clump containing this frond was divided and potted up. The 5 divisions all had fronds and pinnae of normal size, though many of the pinnae were fish-tailed. After two years this frond has not reappeared and only a few of the fish-tailed pinnae have appeared.

This demonstrates several problems with herbarium specimens and the stability of forms. First, in a rough count of the herbarium specimens at the Academy of Natural Sciences in Philadelphia, about one fifth of the *Polystichum acrostichoides* specimens were unusual forms. This contrasts with finding one unusual form per examination of hundreds of plants in the field. Second, of the unusual forms about one half were form *incisum*! Third, as demonstrated by the RGB plants, not all forms are stable.

This concludes section II. Section III will present “plants that merit attention” and a complete annotated bibliography.

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